

MULTISTACK[®]

Originators. Innovators. Never the Imitators.sm



Air-Cooled Modular Split Systems Product Data Catalog

**MS010XN_A, MS015XN_A,
MS020XN_A, MS030XN_A,
MS040XN_A, MS050XN_A,
MS070XN_A, MS085XN_A**

**Standard and Total Access[™]
Configurations**

Features & Benefits

Highly Dependable

- Multiple independent systems for built-in standby
- Comprehensive computer monitoring of operations
- Automatic diagnostic recording of fault conditions
- Rotates lead compressor every 24 hours

Simple To Operate

- Large LCD screen displays information in plain English
- Simple keypad provides control of unit operations

Easy To Install

- Compact modules fit through standard doorways and into elevators
- Modules interconnect easily and quickly
- All refrigeration systems are evacuated and shipped with a holding charge of nitrogen
- Each compressor is charged with oil. (Additional oil may be required at the time of start-up to accommodate the air cooled condenser and interconnecting lines.)

Computer Control System

- Operates only the capacity required by the load
- Provides local and remote monitoring control of the chiller
- Operates at peak efficiency at any given load
- Provides operating load profile

Design Flexibility

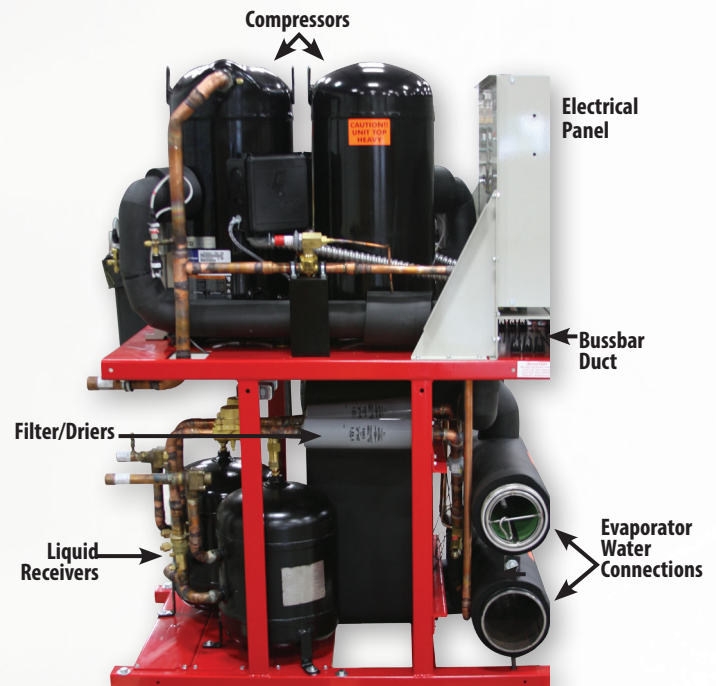
- Wide array of module combinations
- Install only the capacity required when needed

Simple To Service

- Does not require unique proprietary training
- Service can often be performed on a convenient, non-emergency basis
- Most components are standard, off the shelf design

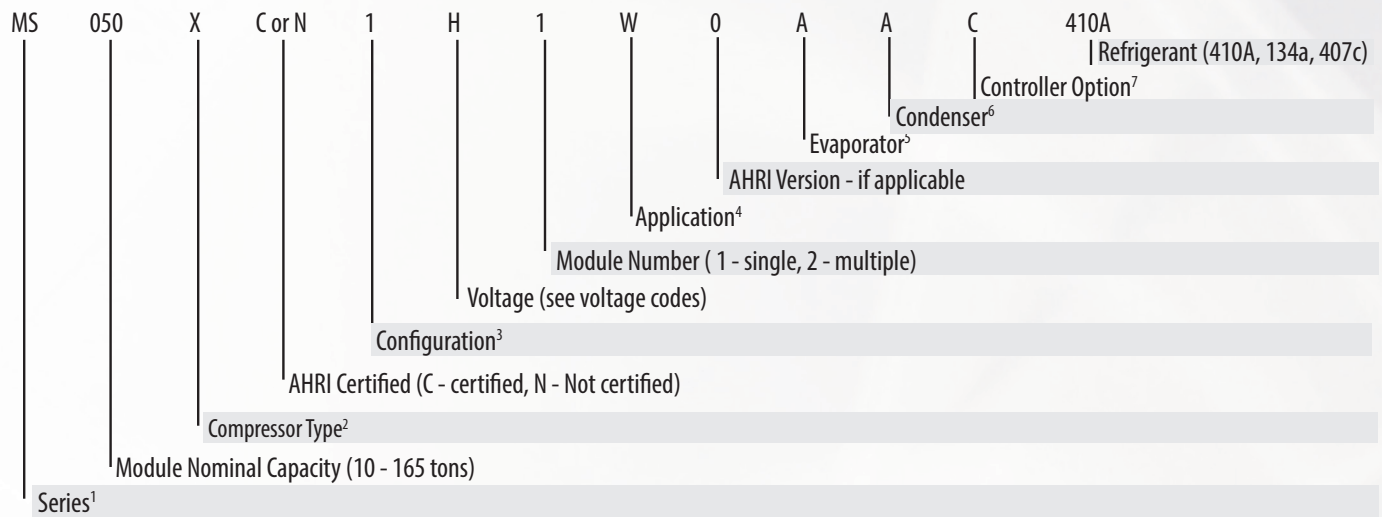
Options

- Vertical discharge and liquid connections available upon request.



Contents

Features & Benefits.....	2
Model Number Description.....	3
General Data, Typical Dimensions	3-8
Piping Diagrams & Information.....	9-10
Electrical Data.....	11
Controls Information.....	12-13
Mechanical Specifications.....	14



¹ MS - Multistack (non - reversing valve), MR - Multistack Heat pump (w/ reversing valve)

² A - Copeland Scroll (ZR), B - Bristol, C - Trane Cornerstone, D - Copeland Digital Scroll, H - Hanbell screw, N - none, R - Bitzer Screw, S - Trane Scroll, T - Danfoss Turbocor, Z - Copeland scroll (old elec), X - Copeland Scroll (ZP)

³ 1 - Standard, 2 - Total access, 3 - Evap extended headers, 4 - Cond extended headers, 5 - Both extended headers, 6 - Outdoor, V - others

⁴ A - Air Cooled split, C - Single module temp controller, D - Cond unit, F - Fluid cooler (high temp), H - Heat recovery, R - Heat pump, W - Water cooled

⁵ A - Braze SS, B - Braze SMO, C - S&T copper, D - S&T cu-Ni, O - remote by others, R - remote by MS, V - Other

⁶ A - Braze SS, B - Braze SMO, C - S&T copper, D - S&T cu-Ni, E - Double wall braze, O - remote by others, R - remote by MS, V - Other

⁷ F - FlexSys base, G - FlexSys with options, C - Carel, V - Other

General Data - Standard Units

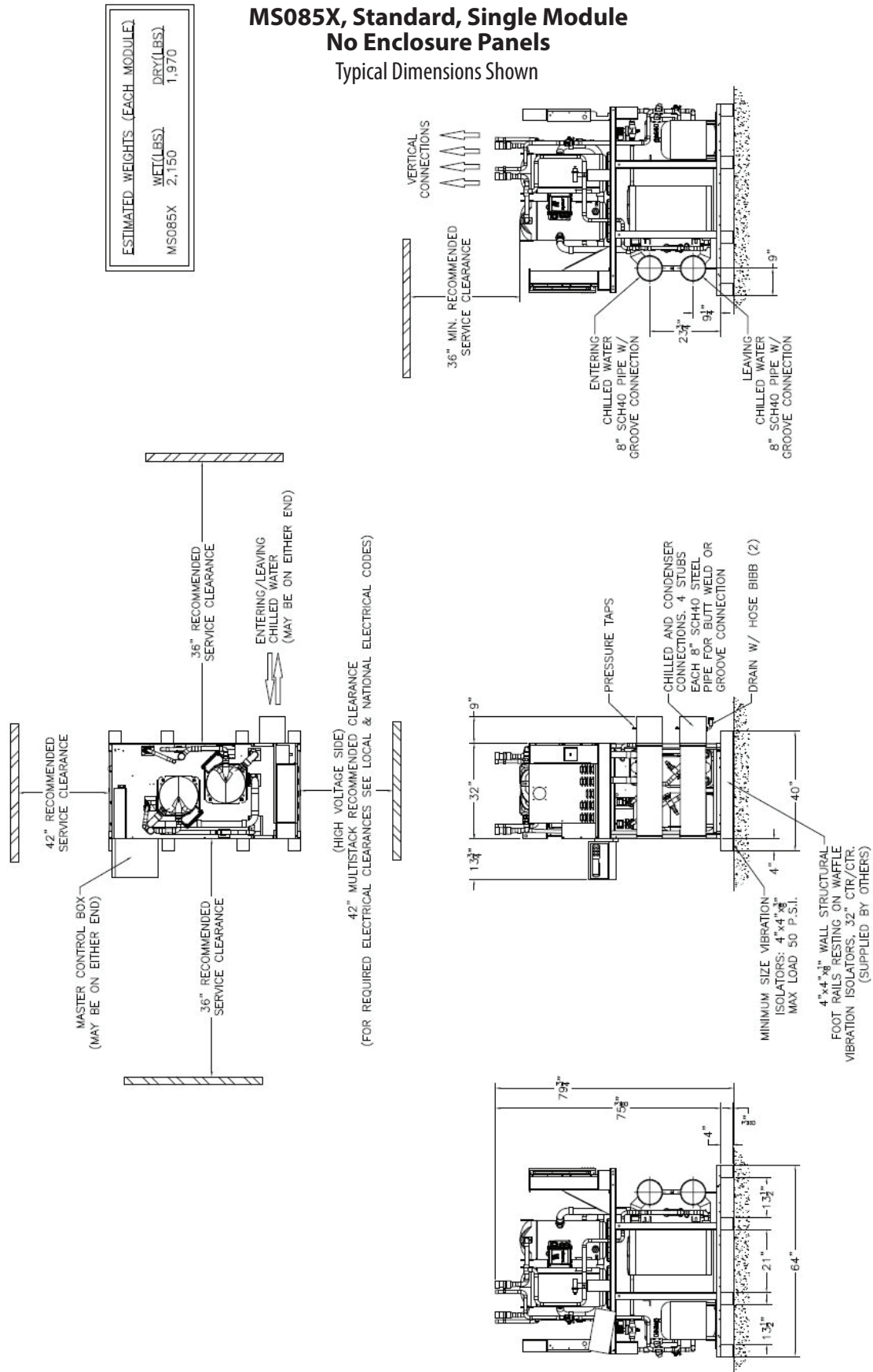
MODEL	MS010XN_A	MS015XN_A	MS020XN_A	MS030XN_A
Compressor Type	Scroll	Scroll	Scroll	Scroll
Weight (lbs. each)	89	135	160	227
Normal Capacity (tons)	10	15	20	30
Quantity	2	2	2	2
Oil Charge (pints)	3.5	6.9	7	11.5
Evaporator	Braze Plate	Braze Plate	Braze Plate	Braze Plate
Weight (lbs each)	51.7	51.7	51.7	51.7
Water Storage (gallons)	2.42	2.42	2.42	2.42
Quantity	2	2	2	2
Header System (gallons)	5.5	5.5	5.5	5.5
Refrigerant Type	R-410 A	R-410 A	R-410 A	R-410 A
Refrigerant Charge (lbs/circuit)	6.5	6.5	8	10
Number of Circuits	2	2	2	2
Operating Weight (lbs)	1,070	1,120	1,150	1,300
Shipping Weight (lbs)	1,020	1,065	1,100	1,250

MODEL	MS040XN_A	MS050XN_A	MS070XN_A	MS085XN_A
Compressor Type	Scroll	Scroll	Scroll	Scroll
Weight (lbs. each)	268	268	407	441
Normal Capacity (tons)	40	50	70	85
Quantity	2	2	2	2
Oil Charge (pints)	14	14	12.5	13.3
Evaporator	Braze Plate	Braze Plate	Braze Plate	Braze Plate
Weight (lbs each)	90.25	90.25	205	292
Water Storage (gallons)	5.5	5.5	5.20	10.1
Quantity	1	1	1	1
Header System (gallons)	7	5.5	7	13
Refrigerant Type	R-410A	R-410 A	R-410 A	R-410 A
Refrigerant Charge (lbs/circuit)		13	20	28
Number of Circuits	2	2	2	2
Operating Weight (lbs)		1,500	2,050	2,350
Shipping Weight (lbs)		1,475	1,750	2,100

Typical Dimensions- Standard Modules

MS085X, Standard, Single Module
No Enclosure Panels

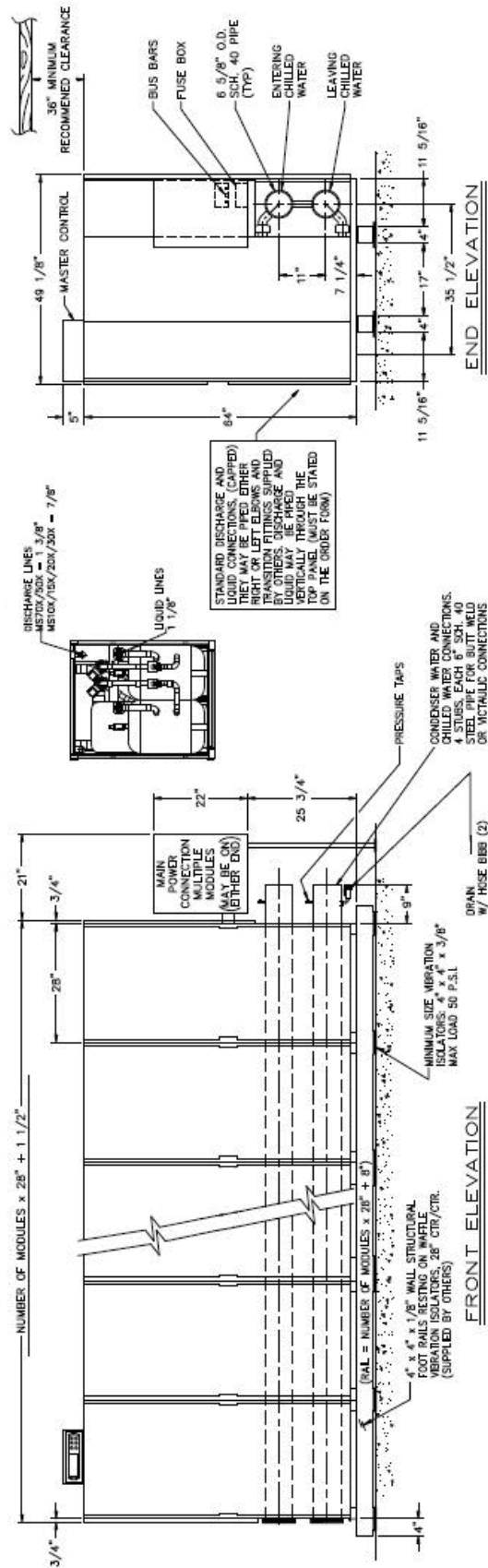
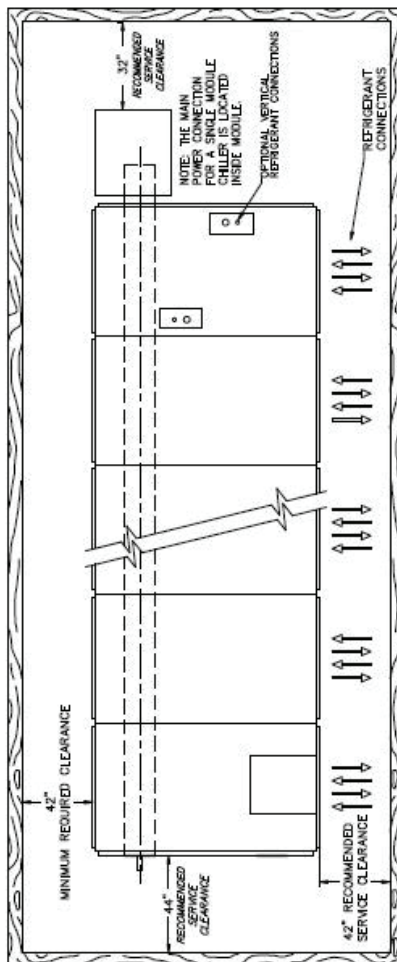
Typical Dimensions Shown



MS010X - MS050X, Standard Five Modules With Enclosure Panels

Typical Dimensions Shown

PLAN VIEW



General Data - Total Access™ Modules

MODEL	MS010XN_A	MS015XN_A	MS020XN_A	MS030XN_A
Compressor Type	Scroll	Scroll	Scroll	Scroll
Weight (lbs. each)	89	135	160	227
Normal Capacity (tons)	10	15	20	30
Quantity	2	2	2	2
Oil Charge (pints)	3.5	6.9	7	11.5
Evaporator	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Weight (lbs each)	51.7	51.7	51.7	51.7
Water Storage (gallons)	2.42	2.42	2.42	2.42
Quantity	2	2	2	2
Header System (gallons)	5.5	5.5	5.5	5.5
Refrigerant Type	R-410 A	R-410 A	R-410 A	R-410 A
Refrigerant Charge (lbs/circuit)	6.5	6.5	8	10
Number of Circuits	2	2	2	2
Operating Weight (lbs)	1,070	1,120	1,150	1,300
Shipping Weight (lbs)	1,020	1,065	1,100	1,250

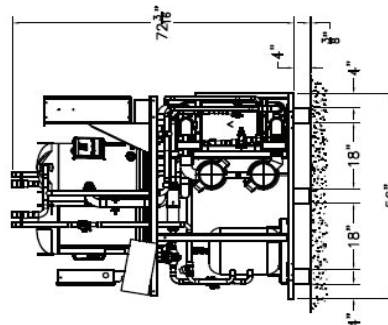
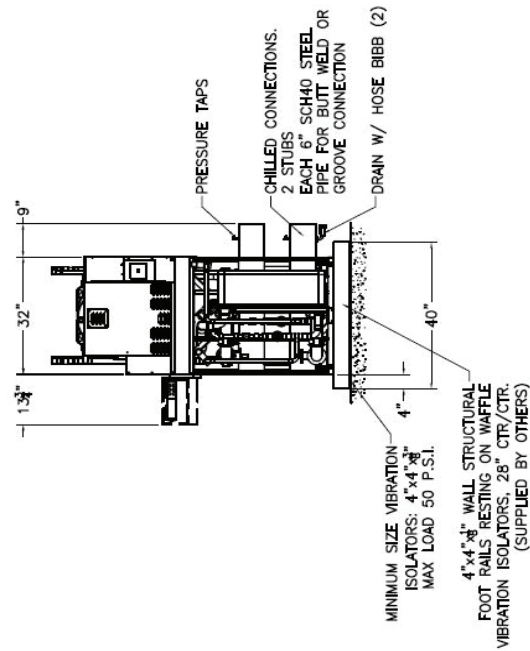
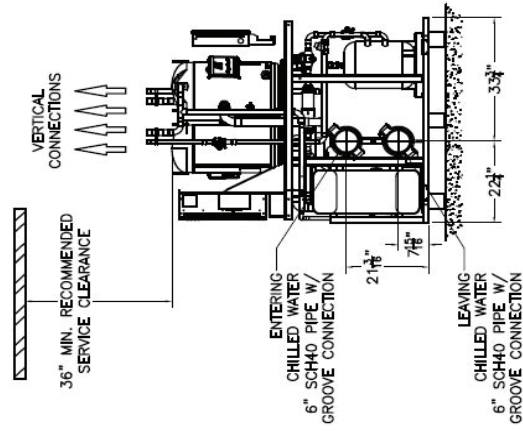
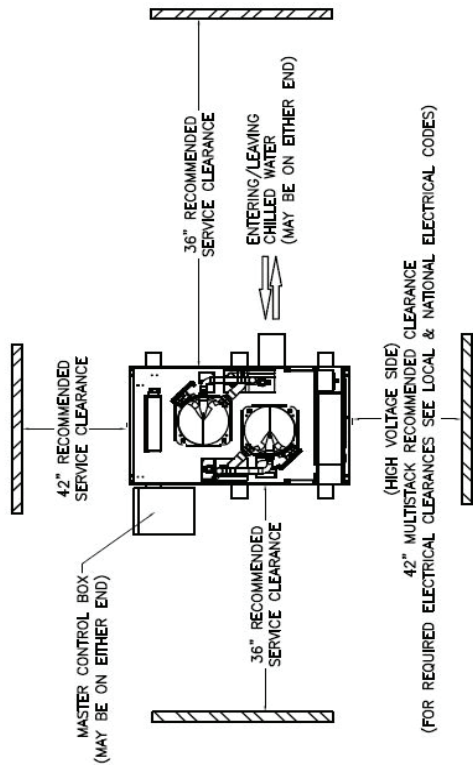
MODEL	MS040XN_A	MS050XN_A	MS070XN_A	MS085XN_A
Compressor Type	Scroll	Scroll	Scroll	Scroll
Weight (lbs. each)	268	268	407	441
Normal Capacity (tons)	40	50	70	85
Quantity	2	2	2	2
Oil Charge (pints)	14	14	12.5	13.3
Evaporator	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Weight (lbs each)	90.25	90.25	205	292
Water Storage (gallons)	5.5	5.5	5.20	10.1
Quantity	1	1	1	1
Header System (gallons)	7	5.5	7	13
Refrigerant Type	R-410A	R-410 A	R-410 A	R-410 A
Refrigerant Charge (lbs/circuit)		13	20	28
Number of Circuits	2	2	2	2
Operating Weight (lbs)		1,500	2,050	2,350
Shipping Weight (lbs)		1,475	1,750	2,100

Multistack has a policy of continual improvement and reserves the right to change product design, literature and specifications without notice. For more information on this and other Multistack products, contact your nearest Multistack dealer.

MS010X - MS050X, Total Access Module No Enclosure Panels

Typical Dimensions Shown

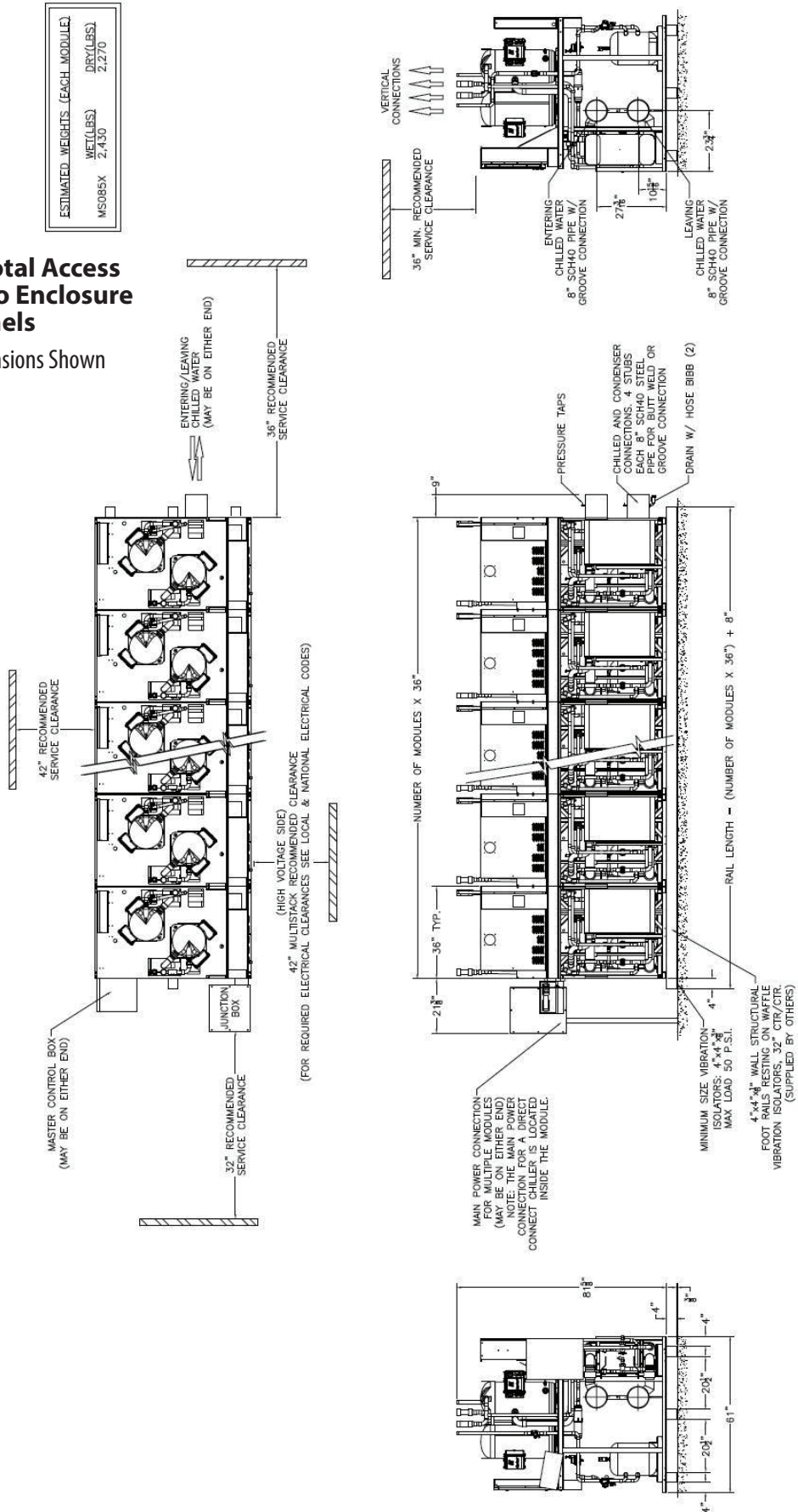
ESTIMATED WEIGHTS (EACH MODULE)			
	WET (LBS)		DRY (LBS)
MS010X	1,400		1,360
MS015X	1,430		1,380
MS020X	1,430		1,380
MS030X	1,530		1,480
MS040X	1,860		1,810
MS050X	1,860		1,810



Typical Dimensions- Total Access™ Modules

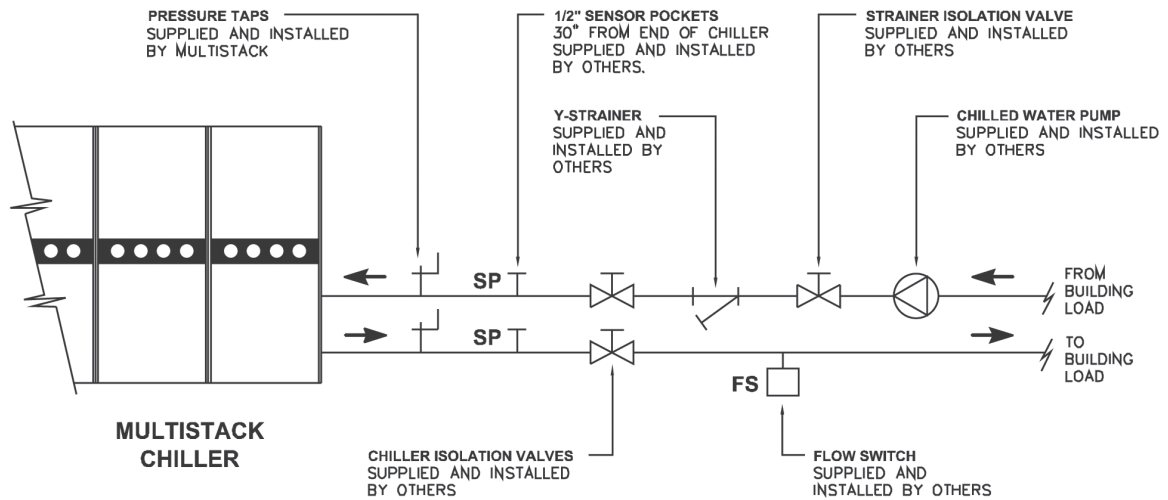
MS085X Total Access Modules, No Enclosure Panels

Typical Dimensions Shown

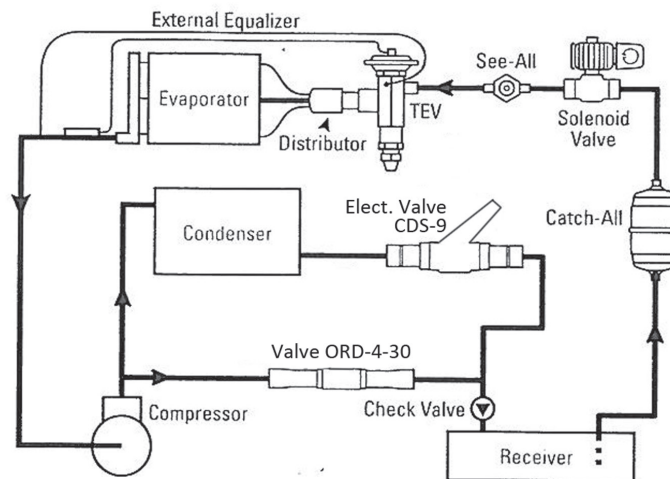


Chilled & Condenser Water Piping

REQUIRED CHILLED WATER PIPING



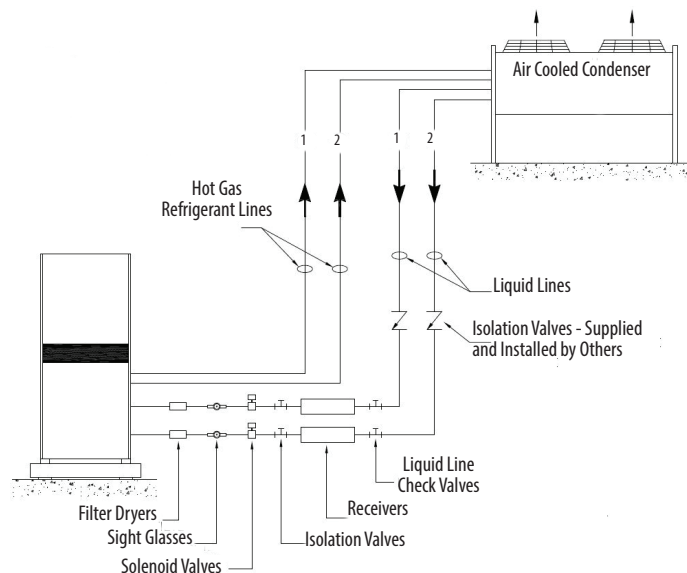
CONDENSER SCHEMATIC WITH HEAD PRESSURE CONTROL



SYSTEM SCHEMATIC

Receivers, filter dryers, check valves and solenoid valves are included in module. 1 and 2 represent refrigerant circuits for each module.

Note: Size the hot gas and liquid lines for the job conditions.



Refrigerant Piping

Refrigeration Components Installed in Standard Unit

The following components, normally required in an air cooled split system, are factory installed and shipped as part of the standard Multistack module.

- Liquid line solenoid valves
- Check valves
- Liquid line filter/driers
- Liquid line sight glass
- Refrigerant receiver tanks with pressure relief valves and manual shut-off valves. Standard receiver size 50 lbs. (Charge depends on size and application. Alternate receivers with pressure relief valves may be required after consulting Multistack.)

Air Cooled Condenser

The air cooled condenser can be purchased directly from a manufacturer by the customer, or as a convenience, Multistack will purchase and supply the condenser. Multistack recommends that the air cooled condenser include:

- Separate condenser circuit for each compressor*
- Condenser fans are controlled by head pressure.
- Flooded condenser head pressure control on each circuit for operation at ambient temperatures down to -20°F.
- 3 ph/60 Hz power voltage compatible with chiller and 24 VAC control voltage
- Additional oil may have to be added to the system at time of start-up to accommodate the air cooled condenser and interconnecting lines.
- To determine the total HEAT OF REJECTION (THR) for selecting the condenser, use:

$$\text{HR/Module (MBH)} = 12 [\text{TONS} + 0.285 (\text{kW})]$$

$$\text{THR (MBH)} = (\text{No. of Modules}) (\text{HR/Module})$$

***CAUTION:** Each Module has two independent refrigeration circuits. A separate condenser circuit is required for each refrigeration circuit.

Interconnecting Refrigerant Piping Between Chiller and Condenser

The interconnecting piping is supplied by others and good engineering practices should be used in sloping and trapping the lines. Recommend line sizes for use with specific modules are:

LIQUID LINE SIZES AIR COOLED						
MODEL	Liquid 50'	Liquid 75'	Liquid 100'	Liquid 125'	Liquid 150'	PSI drop
MS015XN_A	5/8"	5/8"	5/8"	5/8"	5/8"	0.5 - 5.0
MS020XN_A	3/4"	3/4"	3/4"	3/4"	3/4"	0.5 - 3.5
MS030XN_A	7/8"	7/8"	7/8"	7/8"	7/8"	0.5 - 3.0
MS040XN_A						
MS050XN_A	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	0.5 - 2.5
MS070XN_A	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	0.5 - 2.5
MS085XN_A	1 1/8"	1 1/8"	1 1/8"	1 3/8"	1 3/8"	1.0-4.0

DISCHARGE LINE SIZES AIR COOLED						
MODEL	Disch 50'	Disch 75'	Disch 100'	Disch 125'	Disch 150'	PSI drop
MS015XN_A	7/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	2.0 - 4.0
MS020XN_A	1 1/8"	1 1/8"	1 1/8"	1 3/8"	1 3/8"	2.0 - 4.0
MS030XN_A	1 1/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"	2.0 - 4.5
MS040XN_A						
MS050XN_A	1 3/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	3.5 - 5.0
MS070XN_A	1 5/8"	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2.0 - 6.0
MS085XN_A	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2 1/8"	2.0-4.0

System Wire & Fuse Sizing Specifications

(Applicable codes may require different wire sizing)

1. Compressor Rated Load Amps (RLA) and Locked Rotor Amps (LRA)

Data: RLA/LRA

VOLTAGE	208	230	460	575
25T Scroll	81/605*	73/605*	36.5/272*	29/215*
25T Bristol	86/400*	78/400*	39/200*	32/160*
15T Scroll	55/340*	56/340*	26/173*	21/132*
10T Scroll	35/239*	31.5/239*	15.5/125*	12/80*

*Per Compressor

2. Wiring Sizing: Minimum Circuit Ampacity (MCA)

$$MCA = (1.25 \times RLA1*) + RLA2 + RLA3 \dots$$

3. Fuse Sizing: Maximum Fuse (MF), Type RK5 Fuse

$$MF = (2.25 \times RLA1*) + RLA2 + RLA3 \dots$$

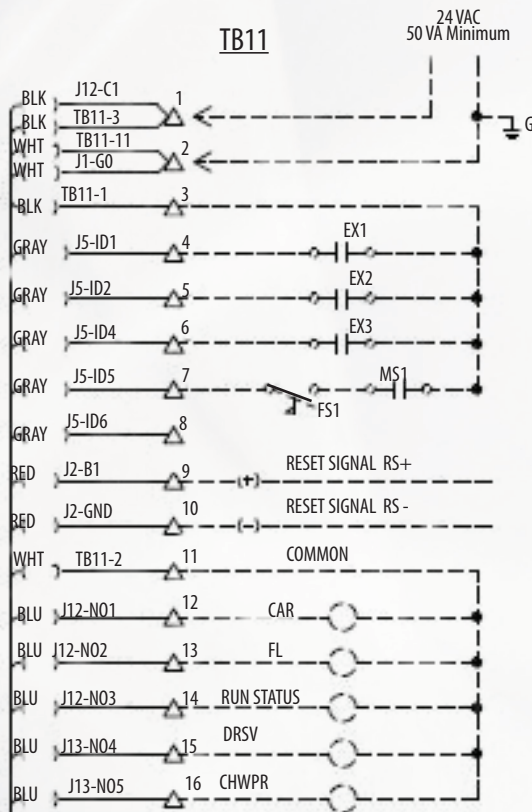
Where the MF does not equal a standard size fuse, the next larger size should be used.

4. NOTES:

- A. Compressor Related Load Amps (RLA) and Locked Rotor Amps (LRA) are based on 125°F Saturated Condensing Temperature.
- B. *RLA1 = RLA of the largest compressor in the system.
RLA2 & RLA3 = RLA of the other compressors in the system.
- C. Total system Minimum Circuit Ampacity (MCA) shall not exceed 500A.
- D. Wire sizing is based on the Nat. Elect. Code (NEC) rating for 75°C copper wire, with 3 wires per conduit.
- E. Wiring distance from branch circuit shall not exceed 100 ft.

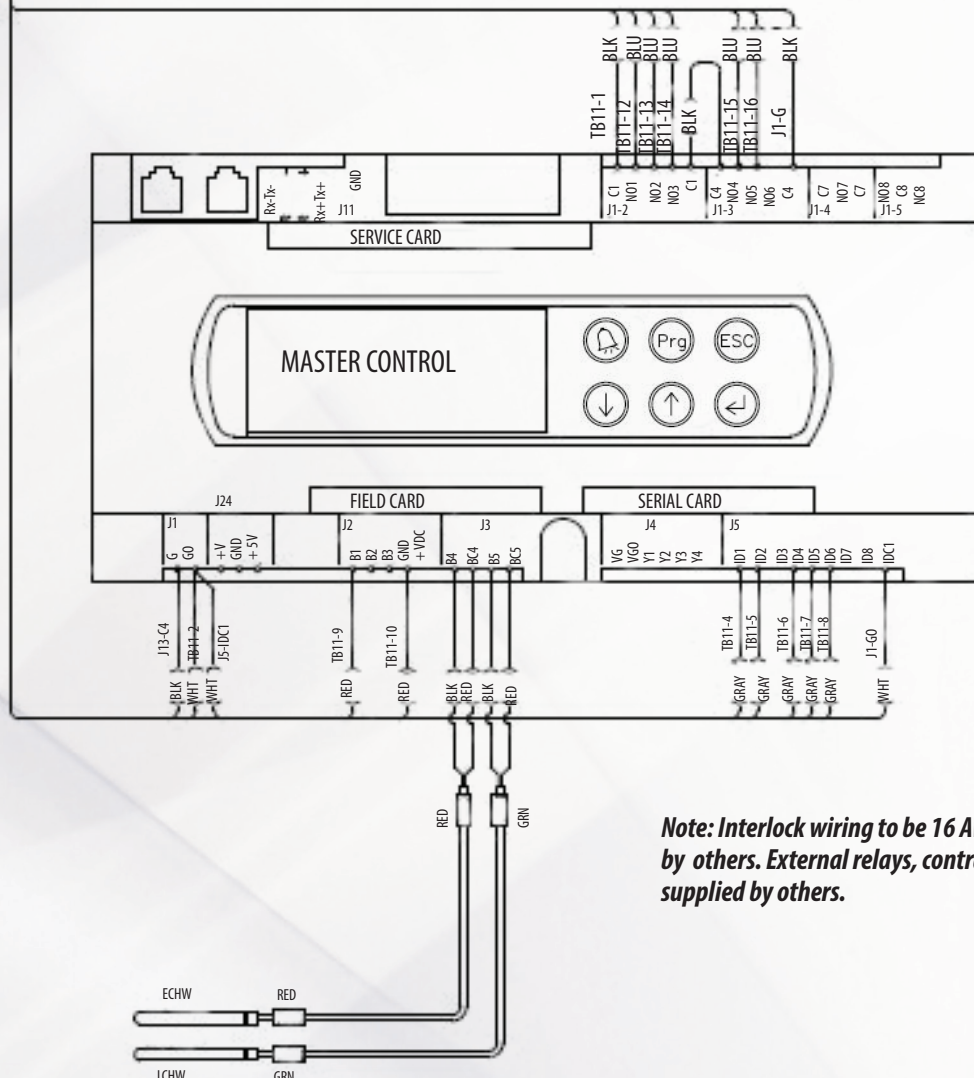
MCA	3 Conductors 1 Conduit	6 Conductors 2 Conduit
508	—	—
656	—	—
854	—	—
100	3	—
115	2	—
130	1	—
150	1/0	—
175	2/0	—
200	3/0	—
230	4/0	—
255	250 MCM	—
285	300 MCM	1/0
300	—	2/0
350	—	3/0
400	—	4/0
460	—	4/0
500	—	250 MCM

Controls Wiring

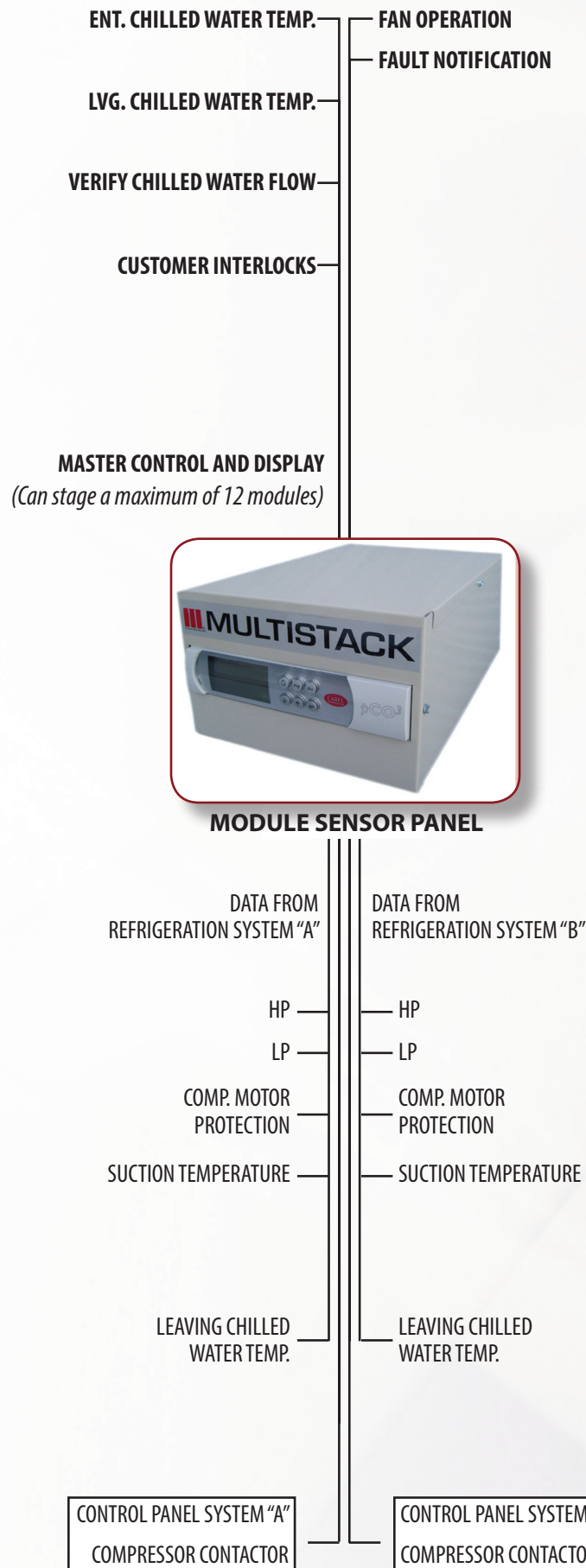
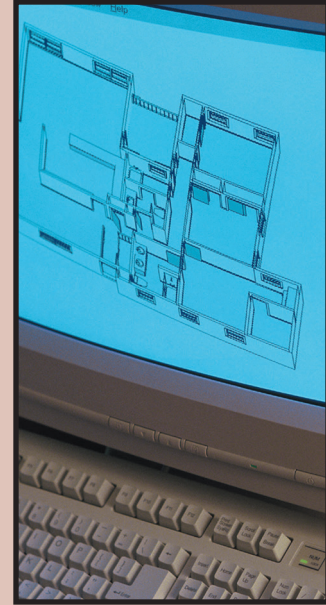


Legend

- Components & Wiring by others. (18 AWG Minimum Wire).
- Inputs to Terminals 4 thru 7 of TB11 must be wired closed if not used.
- External Inputs (Closed to Operate)
 - EX1 - Requires manual reset to resume operation
 - EX2 - Auto reset (Remote Start/Stop)
 - EX4 - Auto Reset (Power Phase Monitor Input)
 - FS1 - Flow Switch (Chilled Water)
 - MS1 - Aux Interlock (Chilled Water Pump Starter)
 - RS+ - Reset Signal (Software Selectable 0 - 10 VDC, 4 - 20 mA)
 - RS- - Reset Signal (Software Selectable 0 - 10 VDC, 4 - 20 mA)
- External Outputs
 - CAR - Customer Alarm Relay (24 VAC, 5 VA Max.)
 - FLR - Full Load Relay (24 VAC, 5 VA Max.)
 - CHWPR - Chilled Water Pump Relay (24 VAC, 5 VA Max.)
 - Run Status - Run Status Relay
 - DRSV - Debris Removal Solenoid Valve (24 VAC, 6W, 16 VA)
 - Maximum of 2 DRSV in this circuit
- Sensor Inputs
 - ECHW - Entering Chilled Water
 - LCHW - Leaving Chilled Water



Note: Interlock wiring to be 16 AWG minimum and field supplied by others. External relays, contractors and flow switches supplied by others.

**REMOTE PC****OPTIONAL
RS-232**

**SERIAL PORT CONNECTION TO REMOTE PC,
MODEM, BUILDING MANAGEMENT
SYSTEMS, OR
BACnet® PORTAL.**

**IDENTICAL
SENSOR PANELS MODULE IN
CHILLER**

Mechanical Specifications

General

Modules are ETL listed in accordance with UL standard 1995 and are CSA certified per standard C22.2 #236.

Modules ship wired, charged with oil, and contain a holding charge of dry nitrogen.

Compressors, heat exchangers, piping and controls are mounted on a heavy gauge steel frame. Electrical controls, contactors, and relays for each module, are mounted within that module.

Factory Mounted Refrigerant Components

Refrigerant receiver tanks with pressure relief valves and shut-off valves, liquid line solenoid valves, check valves, liquid line filter driers and liquid line sight glasses are factory mounted in each module.

Chilled Water Mains

Each module includes supply and return mains for the chilled water. Grooved end connections are provided for interconnection to 6" US standard (6.625" outside diameter) customer piping with victaulic type couplings. Standard units include 30 mesh in-line strainers in the evaporator supply headers.

Evaporators

Each evaporator is a brazed plate heat exchanger constructed of 316 stainless steel; designed, tested and stamped in accordance with ASME code for a 360 psig working pressure.

Air Cooled Condensers

Condensers may be supplied by others, or special ordered by Multistack. Multistack's special ordered condensers come factory assembled. The condenser coil is divided into individual refrigerant circuits, each sized for its own specific application. Each circuit comes with its own inlet and outlet connections, individually labeled.

Compressors

Each module contains two separate refrigeration systems. The hermetic compressor in each system is mounted to the frame with rubber-in-shear isolators. Each system also includes high discharge pressure and low suction pressure cutouts.

Central Control System

Scheduling of the various compressors is performed by the microprocessor control. Compressors operating schedules are sequenced every 24 hours to assure distribution of run time. This microprocessor monitors the following on each refrigeration system:

- Discharge pressure cut-out
- Suction pressure cut-out
- Compressor motor protector
- Suction temperature
- Evaporator entering and leaving chilled water temperature

A fault condition from these controls or sensors will cause a shutdown of that compressor with the transfer of load requirements to another available compressor. When a fault occurs, the microprocessor records the reading of conditions at the time and stores the data for recall by operating personnel. This information can be recalled using the keys and displayed on the LCD screen. A running history of the fault occurrence conditions is maintained (up to the last 20 occurrences) should it be required for trouble shooting.

Individual monitoring of leaving chilled water temperature from each refrigeration system is designed to protect against freeze-up.

The control system monitors entering and leaving chilled water temperatures to determine system load and selects the number of compressors required. Response time and set points are adjustable.

Options

Options are available upon request.

Environmentally Friendly Refrigerants

R-410A

Refrigerant R-410A is widely available, safe, and an environmentally friendly refrigerant. R-410A is available in virtually all Multistack systems making hot water up to 140°F. Good environmental choices!

Environmental Focus

In addition to providing products to deliver reliable comfort and low operating cost, Multistack's products can also reduce your environmental footprint. We are committed to developing and manufacturing cooling and heating products that can reduce fossil fuel consumption and operate on the refrigerants designed to protect the environment. Air Cooled Split Modules and efficiency improvements across our product line are the result of this focus.

Originators...

Multistack invented the modular water chiller. It started with a radically simple idea: chiller modules that could be brought into the equipment room one at a time, through standard doorways and down elevators, to form a fully integrated chiller system. The idea launched a revolution and transformed Multistack into a leader in the commercial water-chiller industry.

Innovators...

Multistack perfected the modular chiller and leads the industry in innovative and environmentally friendly modular solutions. Since founding in the late 1980s, Multistack has engineered, manufactured, and distributed an impressive array of modular air conditioning firsts: the first on-board strainer, the first modular automatic blow-down device, the first modular chiller for variable flow, the first modular chiller-heater (heat pump), the first modular heat-recovery chiller, the first modular air-to-water heat pump, the first modular chiller to utilize MagLev™ compressor technology, and the first modular chiller to utilize R-410A.

Never the Imitators...

Multistack sets the standard in the industry for superior customer service, fast and on time shipment, superior product quality, and new product development.



 **MULTISTACK®**

1065 Maple Avenue P.O. Box 510 Sparta, WI 54656

Phone 608-366-2400 • info@multistack.com

www.multistack.com



MS-SPLIT-CAT-001_0617
Supersedes F113_0613
FWB